

**UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE**

in cooperation with

STATE AGRICULTURAL EXPERIMENT STATIONS

**Report on Hard Red Spring Wheat Varieties Grown in Cooperative Plot and
Nursery Experiments in the Spring Wheat Region in 2003**

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This is a joint progress report of cooperative investigations underway in the State Agricultural Experiment Stations and the Agricultural Research Service of the U.S. Department of Agriculture. It contains preliminary data which have not been sufficiently confirmed to justify general release, and interpretations may be modified after additional experimentation. Confirmed results will be published through established channels. This report is primarily a tool for use by cooperators and their official staffs, and for those persons having direct and special interest in the development of agricultural research programs.

This report includes data furnished by the State Agricultural Experiment Stations as well as by the Agricultural Research Service of the U.S. Department of Agriculture. This report is not intended for publication and should not be referred to in literature citations, nor quoted in publicity or advertising.

Use of the data may be granted for certain purposes upon written request to the agency or agencies involved.

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2003 HARD RED SPRING WHEAT UNIFORM REGIONAL NURSERY REPORT

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COOPERATING AGENCIES, STATIONS, AND PERSONNEL FOR THE 2003 HRSWURN

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Entering Lines with Protected or Patented Genes into the Hard Red Spring Wheat Uniform Regional Nursery

The following information details the Hard Winter Wheat Regional Program position on this issue. Basically, the same situation exists in the Spring Wheat Region, and it is therefore suggested that these guidelines are appropriate and thus accepted for the Hard Red Spring Wheat Uniform Regional Nursery as well, until such a time as the participants agree to deviate from it:

From: Robert Graybosch, Coordinator of Hard Winter Wheat Region

A question has arisen as to whether wheat germplasm lines carrying protected or patented genes may be entered in the HWW regional program. We have decided to allow such submissions, on a provisional basis, for the 2001 nurseries. Submissions must adhere to the provisions below, and submissions of such lines after the 2001 year will depend upon the adoption of formal guidelines. We are in the process of drafting a formal plan, hopefully one that will be approved at the 2001 Hard Winter Wheat Workers Conference.

Provisional plan for the submission of lines with patented or protected genes:

Definition: "protected" gene = a gene whose use is restricted by patents, Material Transfer Agreements, or other types of research agreements.

Wheat lines carrying such traits may be entered in the 2001 HWW Regional nurseries (RGON, SRPN, NRPN) under the following conditions:

1. Cooperators may cross with the line in question. Thereafter, the cooperator making such crosses must either have their own research agreement with the trait owner, or, if such an agreement is lacking, they must remove the trait from breeding populations by selection.
2. The owner of the trait has been informed of the submission, and that they agree to the conditions set forth in #1.
3. All other uses of the line are governed by the Wheat Workers Code of Ethics.
4. The trait may not have been inserted into the wheat genome by genetic engineering. In other words, the wheat line in question may not be transgenic.

At this point in time, transgenics may not be entered in the program. I am certain this question will arise in the near future, so I have contacted USDA-APHIS regarding this point. If you are interested in the details, the attached file contains the pertinent points of our e-mail exchange (note by HRSW coordinator: this file is not included in this report). The APHIS responses are in bold. To make a long story short - transgenic wheat lines will be allowed in the regional program only if they have been granted permanent non-regulated status. Non-regulated status is granted only after the originator files a formal petition to de-regulate a line with APHIS.

SPRING WHEAT PRODUCTION, 2003

SPRING WHEAT OTHER THAN DURUM Growers produced an estimated 532.8 million bushels (13.3 million metric tons) of spring wheat. This production estimate is approximately 35.2 percent higher than year 2002 production, and approximately 4 percent higher than 2001. Yield averaged 39.7 bushels per acre, an increase of 10.4 bushels per acre from year 2002, and 4.5 bushels per acre higher than in year 2001. Area harvested totaled approximately 13.429 million acres (5.37 million hectares), which is approximately the same as the acreage harvested in 2002.

Spring Wheat Production Statistics, 2001-2003.*

	Acres Harvested (1000)			Bushels (1000)			Yield (Bu/Ac)		
	2001	2002	2003	2001	2002	2003	2001	2002	2003
Minnesota	1,800	1,800	1,800	79,200	61,200	104,400	44	34	58
Montana	2,850	3,450	2,700	65,550	75,900	59,400	23	22	22
North Dakota	6,900	5,900	6,400	234,600	165,200	252,800	34	28	39.5
South Dakota	1,650	1,000	1,340	64,350	24,000	56,280	39	24	42
USA	14,569	13,463	13,429	512,608	393,949	532,820	35.2	29.3	39.7

* Source: National Agricultural Statistics Service: (<http://www.usda.gov/nass/pubs/estindx3.htm#wheats>)

NURSERY DESCRIPTION AND SUMMARY

The Hard Red Spring Wheat Uniform Regional Nursery (HRSWURN) was planted for the 75th year in 2003. The nursery contained 32 entries submitted by 9 different scientific or industry organizations, and 5 checks (Table 1). Trials were conducted as randomized complete blocks with three replicates. The HRSWURN was planted at 19 locations in 7 different states in the USA (MN, ND, SD, MT, NE, WY, and WA), and at locations in two separate Canadian provinces (Manitoba and Saskatchewan) (Figure 1). All locations provided data for inclusion in this report (Table 2). Data summaries for each of these locations are presented in Tables 3 through 21. For each location summary, entries are listed in descending order of yield. Overall means across locations for a set of core traits are summarized in Table 22, and yield rankings for individual locations are found in Table 23. Two- and 3-year means for entries previously entered in the 2001 and 2002 HRSWURN are presented in Tables 24 and 25. Entries were also evaluated for *Fusarium* head blight resistance in scab nurseries at St. Paul and Crookston, MN, and adult plant leaf and stem rust resistance was evaluated in one nursery in St. Paul, MN. These data are presented in Tables 25, 26, and 27 respectively. The highest average yielding location was Powell WY, with 114.6 Bu/Ac, while the lowest yielding location was Sidney, NE with 22 Bu/Ac. The average yield for the 19 combined locations was 60.1 Bu/Ac.

Figure 1. Hard Red SpringWheat Uniform Regional Nursery Locations, 2003



Table 1. Entries for the Hard Red Spring Wheat Uniform Regional Nursery, 2003.

Entry No.	Name	Pedigree/CI No	Source	Year
1	Marquis	3651	CAN	1929
2	Chris	13751	MN	1969
3	2375	Olaf//Era/Suqamuxi68/3/Cis/ND487//Lark	NDRF	1998
4	Verde	MN7663/SBY35A	MN	1998
5	Keene	Stoa's'/3/IAS20*4//H567.71//Amidon	ND	1998
6	ND 741	PARSHALL/ND706	ND	2002
7	ND 747	ARINA//FO.2791/ND694/3/ND706	ND	2003
8	ND 751	ND2709/3/GR*3//RAMSEY/ND622/4/ND688/ND674	ND	2003
9	ND 800	ND 741 SELN	ND	2003
10	ND 801	ND2849/ND721	ND	2003
11	NDSW0246	Ernest//ND622/Keene	ND	2002
12	MN99436-6	Norlander/HJ98	MN	2003
13	SD3540	Unknown	SD	2001
14	SD3546	SD8070/SD3165	SD	2001
15	SD3618	SD8119/SD3236	SD	2003
16	SD3635	SD8070/SD3118//SD3225	SD	2003
17	SD3641	1318 316-1-2/N93-0136//SD3249	SD	2002
18	01M88	B1021/MN91227	TRI	2002
19	01M96	B1021/HJ98	TRI	2002
20	N98-0286	N91-0048/Lars	AGP	2002
21	N99-0107	N94-0157//Sumai 3/Dalen	AGP	2002
22	N99-0241	N93-0090/Hamer	AGP	2003
23	N99-2234	AC Barrie/NorPro	AGP	2003
24	960404-03	Hamer//RHT21/Lars	AGP	2003
25	96S0356-15	N95-0319//N86-1076/Dalen	AGP	2003
26	98S0113-20	N97-0117/3/N92-0098//Sumai3/Dalen	AGP	2003
27	BW307	90B01-AD4D/Pasqua	MAN	2003
28	BW314a	RL4763*2/Howell	MAN	2003
29	Entry 221	2002 LfRstGenes	MAN	2003
30	Entry 241	2002 LfRstGenes	MAN	2003
31	Entry 264	2002 LfRstGenes	MAN	2003
32	ES54	Glenlea//90B07-W3B//RL4452	MAN	2003
33	MT9929	MT9401/MT9328	MT	2002
34	BZ 998-447W*	Spillman/WestBred 906R	WPB	2003
35	CA-901-735	Keystone/Ivan	WPB	2003
36	WA007925	Spillman/WPB906R//Sunstar II	WA	2003
37	WA007931*	PI591045/3/Tanager 'S'/Torim 73//Spillman	WA	2003

* hard white spring wheat

Table 2. Location and Comparative Plot Management for 2003 HRSWURN.

	Date		Area (sq. ft.)	Yield (Bu/Ac)	
	Seeded	Harvested	Harvested	CV%	Mean
<u>Canada</u>					
Glenlea	5-May	14-Aug	35	10.1	60.5
Swift Current	1-May	14-Aug	30	23	38.6
<u>Minnesota</u>					
Crookston	28-Apr	13-Aug	37.8	11.7	76.3
Morris	9-Apr	7-Aug	33	7.9	66.6
St. Paul	12-Apr	29-Jul	28	11.7	76.5
<u>Montana</u>					
Bozeman	3-May	14-Aug	32	7.3	41.3
<u>Nebraska</u>					
Sidney	1-Apr	22-Jul	105	6.5	22
<u>North Dakota</u>					
Carrington	24-Apr	13-Aug	83.25	6	69.6
Casselton	11-Apr	7-Aug	48	19	76.5
Hettinger	10-Apr	4-Aug	65.33	10.5	48.4
Langdon	1-May	20-Aug	72	5.3	72.6
Minot	23-Apr	7-Aug	36	7.9	48.8
Prosper	30-Apr	15-Aug	36	10.4	81.6
Williston	23-Apr	2-Aug	56	11	50.6
<u>South Dakota</u>					
Brookings	1-Apr	1-Aug	70	5.8	66.3
Groton	10-Apr	18-Aug	70	8.7	47.6
Selby	14-Apr	6-Aug	70	7.1	55.5
<u>Washington</u>					
Lind	12-Mar	23-Jul	80	4.61	28.3
<u>Wyoming</u>					
Powell	15-Apr	19-Aug	40	8.3	114.6

Table 3. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Crookston, MN.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm	Lodging 0 to 9	Protein %
960404-03	92.1	61.3	29	79	0.0	14.3
CA-901-735	91.4	62.6	27	80	0.0	14.1
MN99436-6	86.3	61.2	28	83	0.0	14.9
ND 751	83.3	62.9	31	93	0.3	15.1
Keene	82.8	61.5	31	104	1.7	15.2
N99-0241	82.7	59.8	31	84	0.0	14.3
Verde	82.2	60.2	33	87	0.0	13.6
Entry 221	81.7	60.1	31	85	0.0	13.5
Entry 241	81.6	58.2	31	88	0.0	13.3
Entry 264	81.4	59.1	31	90	0.0	13.9
01M88	81.0	60.6	34	79	0.0	13.2
ND 800	81.0	62.7	30	92	0.7	15.1
N99-0107	80.0	60.8	31	88	0.0	14.8
N98-0286	79.6	59.8	32	82	0.0	14.7
ND 801	79.5	63.5	29	93	0.3	15.3
SD3540	79.3	60.6	27	90	1.3	14.3
WA007925	79.3	60.8	29	96	0.0	15.1
BW314a	79.0	62.3	30	101	0.3	15.5
2375	78.1	62.9	29	82	0.5	14.5
ND 747	75.4	64.6	29	85	0.5	15.7
SD3635	75.1	61.2	30	97	1.3	14.2
SD3546	75.1	62.0	28	96	1.3	15.0
N99-2234	74.4	61.9	34	91	1.0	15.4
SD3618	74.1	61.9	29	87	1.5	14.6
SD3641	73.3	61.8	26	89	0.0	15.0
ND 741	72.2	62.9	31	92	0.7	15.1
01M96	72.1	62.3	27	91	0.0	14.6
WA007931	71.8	58.9	32	94	0.0	12.9
MT9929	69.7	59.1	31	87	0.0	14.7
NDSW0246	69.6	60.5	31	102	0.7	15.4
96S0356-15	67.4	62.0	28	71	0.0	14.2
Marquis	67.2	60.9	30	98	2.5	14.3
BZ 998-447W	67.1	56.3	30	87	0.0	14.5
BW307	66.4	59.8	33	97	1.0	15.2
98S0113-20	65.3	62.9	28	69	0.0	15.6
ES54	62.0	58.7	32	101	0.0	15.8
Chris	61.7	60.5	32	94	3.5	15.4
Mean	76.3	61.1	30.2	89.2	0.5	14.7
LSD	14.6		1.4	8.7	0.9	
CV	11.7		2.9	6.0	104.0	

Table 4. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Morris, MN.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm	Lodging 0 to 9	Protein %
01M88	82.3	63.7	19	71	1.3	11.8
N98-0286	81.3	62.3	19	72	1.3	12.7
Entry 264	81.2	61.3	18	80	1.3	11.7
N99-0241	75.2	62.3	19	77	0.0	12.7
ND 800	74.6	63.7	17	83	0.7	13.3
WA007931	73.7	62.9	19	88	0.7	11.0
CA-901-735	72.8	63.9	15	71	0.0	12.3
SD3635	72.6	62.3	16	89	2.0	11.8
SD3641	72.4	62.7	12	84	0.7	13.8
Entry 241	72.4	59.6	18	80	1.7	10.8
MT9929	72.1	63.3	18	80	0.3	13.3
SD3540	71.6	62.3	15	86	1.0	12.8
MN99436-6	70.5	63.7	16	80	1.7	13.0
960404-03	70.2	63.2	17	69	1.3	12.4
2375	68.4	63.7	16	83	4.7	12.7
BZ 998-447W	68.3	60.3	16	82	1.0	12.2
ND 801	68.2	64.4	17	86	1.0	13.6
ES54	67.9	61.2	19	94	2.7	14.1
Entry 221	67.3	63.5	18	77	2.0	11.5
Verde	67.2	62.6	19	74	0.7	12.4
SD3546	64.9	62.6	17	88	2.0	12.2
SD3618	64.3	62.7	17	89	1.0	13.0
ND 741	64.0	63.6	18	81	0.7	13.2
N99-0107	63.7	62.3	18	83	1.7	12.9
NDSW0246	62.5	62.2	19	92	0.3	14.6
96S0356-15	61.8	63.5	16	75	2.0	12.5
Keene	61.8	63.2	17	97	1.7	12.7
WA007925	61.6	63.0	16	86	3.0	12.1
BW314a	61.1	62.9	16	102	2.7	13.7
01M96	60.8	63.5	16	80	1.0	13.8
Marquis	59.9	61.6	17	97	2.3	12.9
ND 751	58.9	64.0	18	91	1.0	13.3
N99-2234	56.8	62.5	19	95	1.7	14.3
ND 747	54.8	65.4	15	91	1.0	13.7
Chris	53.8	62.2	19	89	4.0	13.7
BW307	52.1	60.5	20	95	2.0	13.0
98S0113-20	50.8	63.7	16	73	2.7	13.1
Mean	66.6	12.8	17.1	84.0	1.5	12.8
LSD	8.6		1.5	5.0	1.0	
CV	7.9		5.2	3.7	41.9	

Table 5. 2003 Hard Red Spring Wheat Uniform Regional Nursery, St. Paul, MN.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm	Lodging 0 to 9	Protein %
BZ 998-447W	93.2	58.7	17	87	0.3	14.1
Entry 221	91.6	59.6	18	87	0.3	13.6
N99-0241	87.6	60.6	17	80	0.0	14.7
MN99436-6	87.3	60.8	15	79	0.3	16.1
Verde	86.8	59.8	18	81	0.0	15.3
Entry 264	86.7	58.1	18	88	0.0	14.5
N98-0286	86.5	60.6	17	77	0.0	14.3
Keene	84.9	61.3	17	105	1.3	15.8
WA007931	84.5	60.8	18	91	0.0	13.4
Entry 241	84.5	56.0	18	85	0.0	13.6
N99-0107	84.1	60.5	17	87	0.0	16.0
960404-03	83.5	60.9	16	73	0.0	15.0
ES54	83.5	58.8	18	105	2.7	16.0
01M88	83.0	62.2	19	75	0.0	13.6
ND 741	80.4	62.0	16	88	0.7	15.7
WA007925	77.9	60.8	16	93	1.7	14.5
96S0356-15	77.8	61.1	15	76	0.0	15.0
ND 800	77.0	61.8	17	85	0.3	15.6
SD3618	76.5	60.6	16	94	2.3	14.9
98S0113-20	76.1	59.6	14	76	0.7	15.5
ND 801	76.0	63.2	17	90	1.3	15.8
2375	75.7	61.1	16	88	1.7	15.3
01M96	73.5	62.0	15	89	0.3	15.6
NDSW0246	73.4	60.9	18	102	0.7	15.9
ND 747	73.3	63.3	15	97	0.7	16.5
Marquis	72.9	59.2	16	109	3.7	15.0
CA-901-735	72.0	63.6	15	73	0.0	15.3
BW307	71.8	57.5	18	111	2.3	17.3
ND 751	71.5	61.6	18	90	0.7	15.8
SD3546	71.5	60.6	15	99	2.3	15.7
SD3540	70.6	61.1	14	93	1.5	14.8
SD3635	70.0	60.9	16	97	1.7	14.4
BW314a	66.5	60.3	15	112	4.7	17.1
N99-2234	64.8	60.9	16	104	4.7	16.0
MT9929	64.4	61.1	18	78	0.0	14.9
Chris	54.5	59.8	17	103	3.3	16.3
SD3641	36.6	61.3	12	89	-	15.2
Mean	76.5	15.2	16.3	90.2	1.1	15.2
LSD	14.5		0.9	4.1	1.4	
CV	11.7		3.3	2.8	79.2	

Table 6. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Prosper, ND.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm
ND 800	98.8	63.0	29	88
SD3618	96.4	62.3	28	81
ND 741	96.1	63.2	29	90
SD3546	94.9	62.6	27	91
MN99436-6	92.0	61.9	28	77
SD3635	91.9	62.2	28	87
Entry 264	90.6	61.1	30	89
SD3641	90.3	62.1	27	77
2375	88.4	62.9	30	84
N98-0286	88.0	61.5	31	80
01M88	86.8	62.2	31	75
Entry 241	86.0	58.6	31	86
ND 801	85.8	63.4	28	84
ES54	84.3	61.6	31	94
96S0356-15	83.7	61.8	27	76
960404-03	83.3	61.6	28	74
ND 751	83.1	63.8	30	93
SD3540	82.8	61.0	27	93
N99-0241	82.8	60.8	30	84
WA007925	82.0	60.2	27	85
Verde	81.8	61.2	29	79
CA-901-735	81.3	62.7	27	75
N99-2234	81.3	62.0	32	90
N99-0107	80.2	61.8	29	85
01M96	79.6	62.9	28	84
Keene	76.9	62.2	30	97
WA007931	76.6	62.1	30	91
Entry 221	75.7	60.9	30	86
NDSW0246	75.7	62.0	34	96
BW307	75.3	60.1	33	102
ND 747	74.4	63.5	29	85
BW314a	72.5	61.7	28	96
98S0113-20	70.3	62.7	27	83
BZ 998-447W	67.6	56.6	28	83
MT9929	67.0	61.2	32	91
Chris	57.9	61.4	30	102
Marquis	57.0	60.5	33	107
Mean	81.6	61.7	29.3	86.9
LSD	13.8	1.5	2.6	8.9
CV %	10.4	1.5	2.6	16.0

Table 7. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Langdon, ND.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm	Lodging 0 to 9	Leaf Disease* 0 to 100	Tombstone %
SD3546	86.3	62.3	31	110	0	20	0
SD3618	82.6	62.0	31	103	0	20	1
ND 800	80.6	62.7	32	102	1.3	10	0
SD3641	79.5	62.3	31	94	0	30	0
ND 801	78.7	63.2	32	102	0.7	25	0
960404-03	78.7	61.2	30	87	2.7	15	0
ND 741	78.0	62.8	32	101	0.7	30	0
ND 747	77.4	64.8	34	101	0	20	0
CA-901-735	77.4	62.0	31	87	0.3	25	0
ES54	77.3	60.7	30	115	0.3	15	0.3
WA007925	77.2	59.8	29	105	0.3	25	0.7
SD3540	76.8	61.8	31	99	0	20	0
N99-0241	76.6	60.2	29	98	0.3	25	0
2375	75.7	62.2	31	100	1	30	0
N98-0286	75.7	60.2	29	94	0.3	35	0.3
Verde	74.8	59.7	29	91	1	10	0
N99-0107	74.6	60.0	29	96	1.7	15	0
MN99436-6	74.2	62.0	31	92	0	45	0
96S0356-15	73.1	61.8	31	89	0	20	0.3
N99-2234	72.9	61.3	30	105	0.7	25	0.3
98S0113-20	72.9	61.8	31	87	1.7	20	0
ND 751	72.4	61.7	31	104	4	12.5	0
BW307	72.0	59.3	28	114	3.3	17.5	0
SD3635	71.9	61.0	30	106	1	20	0
BW314a	71.3	61.5	31	115	0.7	35	0
Entry 221	71.3	59.0	28	97	1	20	0.3
Entry 264	71.3	58.0	27	98	2	15	1
NDSW0246	71.1	62.0	31	111	1	25	0
01M96	70.8	61.8	31	100	0	20	1
01M88	70.0	59.2	28	89	1	7.5	0
Entry 241	69.9	54.5	24	102	3.7	10	3.3
MT9929	68.3	59.5	29	92	0	15	1.3
WA007931	66.1	57.5	27	104	2	35	0.7
BZ 998-447W	65.1	55.0	24	101	1.7	35	3.3
Keene	62.6	60.7	30	112	0.3	15	2.3
Chris	45.5	58.8	28	119	6.3	25	0
Marquis	44.6	59.3	28	120	5	35	0
Mean	72.6	60.6	29.6	101.2	1.2	22.2	0.4
LSD (0.05)	6.2	1.2	1.2	4.8	1.7	NS	1.1
CV %	5.3	1.2	1.2	2.9	85.8	47.8	153.0

* leaf disease measured on 2 reps.

Table 8. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Casselton, ND.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height* cm	Scab* %	Septoria 1 to 9
ENTRY 241	94.0	58.1	25	68	7.5	3
SD3635	90.1	62.0	22	66	5.0	7
WA007925	89.1	61.5	22	69	17.5	8
N99-0107	88.6	59.5	23	64	2.5	2
960404-03	86.9	62.2	21	54	5.0	5
01M88	86.3	61.6	26	47	0.0	3
SD3540	85.7	61.6	21	67	5.0	9
N99-0241	85.6	60.3	25	57	5.0	3
SD3618	85.4	62.0	23	58	17.5	8
MN99436-6	85.3	62.3	21	55	15.0	8
SD3641	85.2	62.2	18	62	5.0	9
N98-0286	85.2	60.5	24	57	5.0	5
ND801	84.8	63.4	22	64	7.5	4
ND800	84.1	62.5	23	67	15.0	3
2375	83.5	61.5	21	58	12.5	9
ND747	82.3	63.5	21	64	5.0	5
ENTRY 221	81.7	60.7	22	66	15.0	7
BW307	81.2	59.5	26	72	7.5	7
PARSHALL**	77.6	62.2	21	69	20.0	8
BW314A	77.1	61.7	23	81	27.5	8
BZ998-447W	76.9	57.2	21	72	40.0	9
SD3546	76.2	61.6	21	61	15.0	7
96S0356-15	76.0	62.1	21	53	20.0	6
WA007931	75.6	60.1	26	75	7.5	8
98S0113-20	75.2	61.7	21	48	17.5	7
NDSW0246	74.5	61.7	24	78	10.0	3
N99-2234	73.2	60.3	26	73	2.5	6
KEENE	73.0	61.1	23	66	10.0	4
CA-901-735	71.3	60.7	21	57	7.5	5
ND741	71.1	62.2	22	64	10.0	4
ERNEST**	70.0	61.2	27	77	15.0	3
ES54	70.0	60.0	28	77	7.5	5
ND751	69.8	62.0	24	61	0.0	3
01M96	65.5	61.9	21	61	10.0	8
ENTRY 264	64.4	59.2	23	64	10.0	4
ARGENT**	64.3	61.7	24	70	20.0	6
MT9929	61.1	60.5	25	62	17.5	8
CHRIS	60.8	60.1	25	75	5.0	7
MARQUIS	55.7	60.5	24	88	7.5	8
VERDE	36.4	56.8	23	55	7.5	4
Mean	76.5	61.0	23.0	65.0	11.0	5.9
LSD (0.05)	17.6	4.0	1.0			2.0
CV	19.0	19.0				

*Evaluated in 2 of the 3 replications

** Extra entry for this location

Table 9. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Minot, ND.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm
WA007931	60.0	64.6	27	75
WA007925	57.3	63.5	23	70
SD3540	56.5	64.0	25	67
01M88	55.2	65.1	29	60
SD3618	54.7	64.0	26	73
SD3546	54.2	63.6	25	72
BW307	53.0	59.4	28	83
ND 800	52.1	64.5	25	70
MN99436-6	52.1	63.6	24	58
ND 747	51.0	65.5	24	68
Keene	50.6	62.7	28	76
ND 751	50.4	64.4	27	67
Entry 264	50.1	62.3	26	70
N98-0286	49.9	62.4	28	60
ND 741	49.5	64.4	26	68
960404-03	49.5	63.2	24	53
SD3635	49.2	64.2	25	72
Verde	49.0	63.3	27	63
N99-0107	48.9	63.3	26	67
ND 801	48.0	64.8	24	70
N99-0241	47.9	63.0	27	60
SD3641	46.8	62.4	21	57
BW314a	46.8	62.4	24	78
Entry 241	46.8	60.9	27	67
2375	46.4	63.0	26	63
Chris	46.3	62.3	29	82
MT9929	46.2	62.4	27	62
NDSW0246	46.0	62.9	28	77
BZ 998-447W	45.8	61.9	24	65
Entry 221	45.4	62.6	26	65
98S0113-20	45.1	63.3	22	58
CA-901-735	45.0	64.9	24	58
ES54	43.8	61.5	29	77
N99-2234	43.6	62.8	28	73
96S0356-15	43.3	63.1	23	60
Marquis	40.5	62.7	26	92
01M96	39.9	64.8	24	60
Mean	48.8	63.2	25.8	68.0
LSD	6.3	0.6	1.6	17.5
CV %	7.9	0.6	1.5	15.8

Table 10. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Carrington, ND.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm	Lodging 0 to 9	Early Disease % flag leaf*	Late Disease % flag leaf*	1000 K Wt. g
Entry 264	81.0	61.5	23	94	2.0	19	36	39.1
N98-0286	81.0	62.2	24	75	0.0	19	41	36.8
Entry 241	77.7	60.0	23	88	2.3	21	35	38.5
SD3635	77.5	63.8	22	94	1.0	31	47	35.7
960404-03	77.1	63.0	22	71	0.0	22	34	33.8
N99-0107	76.0	62.8	23	88	0.0	9	28	34.1
SD3618	76.0	63.3	23	88	0.3	21	44	36.0
2375	75.8	63.7	22	86	2.0	38	80	38.5
N99-0241	75.8	62.7	25	83	0.0	12	28	34.5
SD3540	74.7	63.3	20	86	0.7	22	60	35.2
Verde	73.8	62.6	24	79	0.0	25	41	35.8
01M88	73.3	63.8	25	75	0.0	10	31	32.1
ND751	72.7	64.3	24	94	1.0	18	31	36.1
SD3546	71.3	63.8	21	91	1.0	20	40	41.8
96S0356-15	71.2	62.4	21	74	0.3	40	66	32.6
WA007925	70.8	62.5	21	94	1.7	25	55	34.4
ND801	70.5	64.4	23	90	0.3	12	28	34.3
ND800	69.8	63.8	23	89	0.7	21	37	35.8
98S0113-20	69.2	62.8	20	72	1.3	16	44	32.7
SD3641	68.7	61.7	20	80	2.0	35	72	35.4
MN99436-6	68.6	62.5	21	81	1.3	25	47	31.4
N99-2234	68.3	63.5	24	97	1.0	25	54	36.7
Entry 221	67.9	62.0	23	85	1.7	30	33	37.5
CA-901-735	67.5	63.4	21	73	0.0	30	41	37.3
ES54	67.0	62.4	26	102	2.0	22	50	41.9
ND741	66.8	63.8	22	91	1.0	20	45	35.9
ND747	66.6	65.2	22	91	0.3	21	35	36.1
01M96	65.5	63.4	21	84	0.0	36	53	35.5
WA007931	65.0	61.6	23	88	1.0	40	69	34.6
NDSW0246	64.6	63.6	25	100	0.7	14	30	35.2
Keene	63.4	63.2	24	103	0.3	10	24	32.9
BW314a	60.8	62.3	20	97	2.7	15	55	36.6
BW307	60.0	60.8	26	104	2.3	15	47	37.7
Marquis	57.6	63.0	27	111	3.0	29	81	34.5
MT9929	56.6	62.5	22	76	2.0	31	49	33.7
BZ 998-447W	56.4	56.4	22	86	1.3	43	61	35.2
Mean	69.6	62.7	22.7	87.9	1.0	23.4	45.8	35.7
LSD (0.05)	6.8	0.7	1.3	5.3	0.7	9.9	14.9	1.6
CV %	6.0	0.7	1.3	9.4	43.6	25.7	19.8	2.6

* Early disease = late milk to early dough; Late disease = medium dough stage.

Note: Chris not entered at this location.

Table 11. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Hettinger, ND.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm	Protein %
SD3641	57.1	58.1	17	83	16.1
SD3635	55.1	57.5	20	86	16.1
Entry 241	54.6	53.0	21	76	15.9
N99-0107	53.9	56.2	20	92	16.3
N98-0286	52.3	54.6	21	74	16.6
SD3540	52.2	57.8	18	83	16.8
ND800	51.5	55.8	20	84	16.8
Entry264	51.5	55.3	21	78	16.3
WA007925	51.4	56.7	19	79	17.5
WA007931	51.3	56.1	21	95	16.5
98S0113-20	50.7	57.4	18	68	16.9
96S0356-15	50.3	58.2	18	68	16.4
01M88	49.8	57.9	23	76	16.7
MN99436-6	49.6	58.2	18	75	16.5
ND741	49.5	55.4	21	85	16.8
Entry 221	49.5	55.9	20	78	16.3
Keene	49.2	58.2	22	94	16.9
CA-901-735	49.2	53.7	18	67	17.0
2375	49.1	57.6	20	81	16.7
960404-03	48.7	55.3	19	71	16.8
MT9929	48.7	54.6	20	69	16.7
ND801	48.4	56.1	20	85	17.1
01M96	47.6	59.7	17	79	16.3
BZ998-447W	47.6	53.0	18	76	16.3
Verde	47.5	56.4	21	76	16.6
SD3618	47.4	55.3	20	80	16.4
ND747	46.6	57.3	19	83	17.4
NDSW0246	46.6	58.0	22	85	17.4
N99-2234	46.2	56.4	22	87	17.7
N99-0241	45.0	53.6	22	75	17.2
ES54	44.5	55.9	23	82	17.8
BW307	43.9	54.2	23	92	17.5
BW314a	43.0	55.9	19	92	17.7
ND751	42.8	57.1	20	90	16.6
SD3546	40.8	56.9	18	86	17.1
Marquis	39.5	57.9	24	96	17.2
Chris	37.8	55.7	22	93	17.4
Mean	48.4	56.3	20.0	82.0	16.8
LSD (0.05)	8.2	1.4	1.0	7.0	0.7
CV %	10.5	1.6	3.9	5.3	2.6

Note: There was no lodging at this location.

Table 12. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Williston, ND.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm	Leaf Necrosis %*	Protein %
Reeder**	59.8	60.5	26	77	25	16.2
BZ 998-447W	59.2	57.4	24	78	50	15.6
ND 800	57.9	60.3	26	78	10	15.5
01M88	57.0	60.9	29	67	10	15.2
Verde	56.2	59.2	29	69	15	16
N99-0107	56.2	60.3	25	82	20	16
96S0356-15	55.7	60.3	23	67	30	15.6
2375	54.5	61.3	25	76	30	15.5
WA007931	53.9	60.5	25	81	10	15.1
Entry 241	53.9	56.2	27	78	10	15.1
Entry 264	53.6	59.8	26	78	10	15.3
SD3546	52.2	60.0	23	85	40	16.1
01M96	52.1	63.1	25	80	80	17.1
WA007925	52.0	61.1	23	81	40	17.2
CA-901-735	51.4	61.4	23	63	25	15.3
MN99436-6	51.2	60.8	22	73	20	16.7
N98-0286	51.1	57.3	28	65	60	16.3
SD3635	50.3	59.8	24	79	95	16.6
SD3641	49.9	58.5	21	73	90	16.9
ND 741	49.7	59.5	26	76	70	16.9
SD3618	49.7	59.4	24	85	70	16.6
N99-0241	48.9	58.1	29	76	50	17
N99-2234	48.8	59.6	27	94	35	18
Chris	48.7	59.5	28	89	20	17.5
Keene	48.6	60.6	28	90	15	16.5
Entry 221	48.5	60.2	28	67	10	14.9
BW314a	48.4	60.1	23	95	50	16.6
960404-03	48.0	57.6	26	64	40	16.6
MT9929	48.0	59.7	25	67	70	17.6
ND 801	47.5	62.0	23	77	40	16.9
Parshall**	47.4	61.1	25	84	60	17.2
SD3540	47.3	60.4	23	74	95	16.7
BW307	47.0	56.7	28	83	50	18.3
98S0113-20	46.7	60.7	22	61	60	16.6
ND 751	46.7	61.3	27	87	50	17.2
NDSW0246	45.1	60.9	26	83	30	17.8
ES54	44.4	58.9	29	89	20	18
Marquis	43.8	59.6	29	96	30	17.2
ND 747	41.9	62.8	25	76	50	17
Mean	50.6	59.9	25.5	78.1	40.6	16.5
LSD (0.05)	9.0	1.5	1.3	7.2		1.1
CV %	11.0	1.5	3.0	5.7		3.3

* Leaf necrosis as a visual estimation of the flag and flag leaf-1 affected.

** Extra entry for this location.

Table 13. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Selby, SD.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm	Protein %
Entry 264	66.5	57.4	22	85	13.4
ND800	65.3	58.7	22	89	14.2
Keene	64.3	58.7	23	100	14.7
ND747	64.1	56.0	20	85	15.2
SD3546	64.0	60.5	20	90	14.3
01M96	64.0	61.1	20	84	14.7
ND741	63.7	59.5	22	88	14.9
MN99436-6	61.7	59.1	21	76	13.7
SD3618	61.6	59.3	22	88	14.0
Entry 241	60.9	55.7	23	81	13.2
N98-0286	60.4	58.1	22	76	13.4
ND801	60.3	61.8	21	87	14.5
960404-03	60.2	58.6	22	70	13.4
SD3635	60.2	59.8	22	88	13.0
SD3641	59.9	60.6	18	84	14.5
ND751	59.9	58.6	23	91	14.1
WA007925	59.6	59.6	21	84	13.3
01M88	59.0	59.5	24	76	13.1
N99-0241	58.8	58.7	23	80	13.3
SD3540	57.2	59.0	20	84	13.8
98S0113-20	56.6	59.1	19	73	13.8
NDSW0246	56.0	59.4	22	93	15.2
N99-0107	55.1	57.9	22	86	13.3
WA007931	54.2	59.2	24	95	13.4
96S0356-15	53.2	59.5	20	73	13.0
BW314a	53.2	55.1	22	97	15.4
BW307	53.0	54.4	23	106	15.3
Verde	52.1	58.2	22	81	13.5
CA-901-735	49.5	52.3	20	69	13.4
MT9929	48.0	54.2	22	80	14.2
N99-2234	44.0	58.5	23	89	14.8
Marquis	43.5	54.4	22	95	14.2
BZ-998-447W	43.4	51.3	22	78	14.4
2375	43.1	59.8	22	75	13.9
Entry 221	41.9	55.9	22	80	13.9
ES54	40.1	55.2	24	88	15.5
Chris	34.2	52.1	22	91	15.3
Mean	55.5	57.7	21.7	84.7	14.1
LSD (0.05)	5.4	2.0	1.2	6.0	0.5
CV %	7.1	2.1	0.4	4.3	2.4

Table 14. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Groton, SD.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm	Protein %
Entry 241	60.7	55.2	29	85	14.3
ND801	60.2	61.5	26	82	15.5
ND751	59.8	61.0	28	88	15.7
ND800	59.0	59.8	26	86	15.1
ND741	59.0	60.3	26	82	15.5
ND747	57.5	61.7	23	82	15.4
MN99436-6	55.9	59.5	24	73	15.2
Verde	55.3	58.3	26	74	14.1
960404-03	54.4	58.8	24	62	14.5
SD3546	54.4	59.0	24	86	15.1
SD3540	54.0	58.2	24	83	13.9
N99-0241	53.9	58.5	27	75	15.2
SD3641	52.6	58.3	22	74	14.9
Keene	52.1	59.6	28	100	15.5
98S0113-20	52.0	59.0	23	67	15.3
01M96	50.8	59.5	22	75	15.2
96S0356-15	49.8	57.6	22	68	14.8
SD3618	49.7	57.9	27	83	14.5
Entry 264	48.6	55.3	28	81	14.1
MT9929	47.8	55.5	29	78	15.9
SD3635	47.3	57.8	26	88	13.8
NDSW0246	47.0	58.2	28	97	15.3
ES54	46.9	55.7	29	98	16.1
CA-901-735	46.3	55.8	24	67	14.1
01M88	46.2	56.3	29	69	14.2
N99-0107	45.9	57.6	29	77	14.6
N98-0286	45.8	56.6	27	72	14.3
Entry 221	45.3	54.3	24	77	13.7
N99-2234	45.2	57.6	30	96	16.1
BW314a	39.3	56.4	23	95	15.9
2375	35.5	55.4	28	75	15.0
BZ-998-447W	35.5	50.1	25	81	15.4
BW307	34.7	52.4	31	101	15.8
WA007925	33.5	52.9	25	82	14.5
WA007931	30.1	53.4	30	89	13.6
Chris	29.6	55.1	27	96	15.2
Marquis	18.3	51.3	28	94	14.0
Mean	47.6	57.1	26.2	82.1	14.9
LSD (0.05)	6.8	1.2	2.1	4.5	0.6
CV %	8.7	1.3	0.7	3.4	2.5

Table 15. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Brookings, SD.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm	Protein %
Entry 264	74.3	59.1	17	89	11.4
SD3540	74.1	60.6	16	93	11.1
SD3635	73.7	58.9	17	98	10.5
ND741	72.0	58.6	18	91	12.1
Entry 221	71.2	59.4	17	81	10.7
ND801	71.0	60.3	17	89	11.9
MT9929	70.9	55.3	18	84	12.5
Entry 241	70.6	57.5	18	89	11.1
N99-0107	70.4	60.0	17	90	11.7
ND800	70.3	57.9	17	90	11.8
BZ-998-447W	69.7	56.7	16	90	11.7
MN99436-6	69.5	61.0	16	84	11.7
Verde	69.0	59.3	18	87	11.7
01M88	68.8	59.7	19	83	11.1
SD3618	68.5	59.2	17	94	11.0
2375	68.3	61.1	17	87	11.3
Keene	68.3	58.7	19	104	12.4
WA007931	67.9	58.9	19	94	11.2
ND751	67.7	58.5	18	93	12.4
CA-901-735	67.6	54.1	16	75	11.6
01M96	67.1	61.2	16	88	12.7
SD3546	66.7	60.3	17	95	11.9
96S0356-15	66.1	61.2	16	80	11.8
960404-03	65.9	60.5	16	77	11.0
NDSW0246	65.8	56.4	18	99	12.4
N99-2234	65.0	59.9	18	101	12.0
WA007925	64.8	59.3	15	95	9.8
ND747	64.7	58.9	16	96	12.8
BW314a	64.1	56.5	16	109	12.6
N99-0241	64.0	57.6	18	83	11.9
98S0113-20	63.7	61.3	16	80	12.6
ES54	63.0	55.7	19	103	12.7
N98-0286	59.2	58.5	18	78	12.1
BW307	56.9	53.8	19	106	13.0
Chris	51.2	54.5	17	103	12.9
SD3641	51.1	60.6	13	88	11.9
Marquis	49.5	55.0	18	106	12.0
Mean	66.3	58.5	17.1	91.1	11.8
LSD (0.05)	6.3	2.0	0.9	5.4	0.6
CV %	5.8	2.1	0.3	3.6	3.2

Table 16. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Sidney, NE.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm
BZ 998-447W	31.6	46.8	20	82
01M96	30.2	50.6	19	86
SD3641	27.0	52.4	19	81
96S0356-15	26.9	53.1	19	71
WA007925	26.5	49.7	19	90
Entry 241	26.5	45.3	21	77
Entry 264	26.1	48.8	20	78
98S0113-20	25.9	53.6	19	69
SD3540	25.8	49.1	19	83
Verde	24.6	50.2	20	69
N98-0286	24.4	45.3	22	69
2375	24.0	50.1	19	80
BW314a	24.0	49.6	19	96
WA007931	23.9	46.2	22	83
N99-0107	23.7	48.8	20	79
MT9929	23.6	47.8	21	71
01M88	23.4	49.7	22	68
960404-3	23.2	48.7	21	66
MN99436-6	23.0	49.4	19	74
ND 747	22.8	41.0	19	85
SD3546	22.6	50.2	20	84
ES54	22.4	46.9	22	90
SD3635	22.4	47.1	19	86
Entry 221	22.2	44.8	20	76
SD3618	21.3	47.9	21	81
ND 801	21.3	45.4	21	86
ND 741	19.7	43.1	23	80
ND 800	19.7	42.8	21	78
BW307	18.4	46.8	23	82
N99-2234	18.0	46.6	23	94
ND 751	17.6	42.0	23	86
NDSW0246	17.1	44.2	23	87
CA-901-735	16.8	40.6	20	64
N99-0241	15.9	47.2	23	67
Keene	15.9	45.1	24	91
Chris	14.4	45.0	23	93
Marquis	14.0	42.1	23	90
Mean	22.0	47.1	21.0	81.3
LSD (0.05)	2.4		1.0	6.1
CV	6.5		3.5	11.9

Table 17. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Powell, WY.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm
WA007931	141.5	62.2	25	97
Verde	134.0	62.8	28	86
96S0356-15	133.9	63.7	21	83
2375	132.0	60.5	30	95
01M88	129.0	62.2	30	74
N99-0107	128.5	62.9	22	90
MT9929	126.9	60.4	24	84
ND 741	124.7	58.4	23	94
01M96	122.0	62.5	20	87
ND 800	120.8	56.5	24	87
CA-901-735	120.4	58.8	21	77
960404-03	119.6	62.1	23	82
N98-0286	119.0	60.9	24	80
ND 747	118.5	62.4	20	91
BZ 998-447W	118.3	57.5	20	91
N99-0241	117.0	60.2	27	88
NDSW0246	116.7	61.3	24	104
ND 801	116.4	61.6	23	94
N99-2234	116.0	61.4	28	104
SD3635	114.9	60.6	23	91
MN99436-6	114.4	60.6	24	82
BW314a	112.3	57.4	21	106
SD3540	110.6	60.1	21	98
SD3641	109.2	61.2	20	92
ND 751	107.7	62.5	29	94
98S0113-20	107.6	62.9	20	77
Entry 264	107.5	59.8	23	83
SD3618	107.0	60.6	23	88
WA007925	107.0	63.2	21	96
SD3546	106.9	62.1	20	100
Entry 221	106.0	60.7	23	87
ES54	105.6	60.3	28	104
Entry 241	103.5	58.8	24	88
Keene	102.7	59.4	25	108
BW307	94.0	57.4	30	115
Chris	85.0	57.2	26	107
Marquis	84.1	55.4	31	118
Mean	114.6	60.5	24.0	92.5
LSD (0.05)	15.4	3.5	2.6	7.7
CV %	8.3	3.6	0.9	5.1

Table 18. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Bozeman, MT.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm
Entry 264	47.5	53.3	33	75
MN99436-6	47.2	56.4	30	73
BZ998-447	47.1	53.9	31	74
2375	45.9	56.9	32	79
SD 3641	45.6	56.7	29	79
WA007931	45.3	57.1	33	80
N99-0107	45.2	57.4	33	77
SD 3540	44.8	57.7	30	80
98S113-20	44.6	57.4	31	67
Entry 221	44.5	55.4	33	74
Entry 241	44.4	50.8	34	74
01M96	44.0	60.0	31	75
ND 741	43.3	54.5	33	80
WA007925	42.5	55.5	32	82
SD 3546	42.4	57.0	32	84
BW314A	42.3	55.8	30	99
KEENE	41.2	56.4	33	88
01M88	41.0	56.9	37	66
ND 751	40.8	55.5	34	83
ND 800	40.5	53.9	34	80
MT 9929	40.3	55.4	33	68
N99-0241	40.2	54.6	34	66
96S356-15	40.1	55.4	29	68
ND 801	39.9	56.3	32	84
ND 747	39.9	59.6	31	81
NDSW0246	39.8	56.9	34	82
N98-0286	39.6	53.7	35	63
SD 3635	39.6	54.3	33	82
960404-03	38.6	53.1	33	61
N99-2234	38.6	55.8	33	88
BW307	38.5	53.3	35	90
SD 3618	38.1	53.6	33	82
ES54	37.9	53.1	34	86
Chris	36.2	55.7	36	93
VERDE	36.0	51.6	34	67
CA-901-735	35.7	55.8	31	62
Marquis	29.8	54.9	36	97
Mean	41.3			78.1
LSD (0.05)	4.9			4.5
CV	7.3			8.9

Table 19. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Lind, WA.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm	Protein %
BZ 998-447W	32.6	59.5	0	64	15.1
WA007931	32.0	61.1	3	71	15.1
WA007925	30.9	61.4	0	69	15.8
KEENE	29.7	60.3	2	79	16.0
SD3641	29.6	60.4	-1	66	15.8
SD3540	29.5	61.6	-1	64	15.7
SD3635	29.5	59.4	3	69	15.1
N98-0286	29.3	60.0	3	64	15.5
Entry 241	29.0	57.8	2	69	15.0
N99-0107	29.0	60.5	3	69	15.6
ND 741	29.0	60.6	3	71	16.0
SD3546	29.0	60.7	1	69	15.6
Entry 264	28.9	59.4	2	64	15.7
SD3618	28.8	59.4	2	71	15.3
BW314a	28.7	59.1	-1	81	15.5
CA-901-735	28.7	61.6	0	58	15.5
98S0113-20	28.6	60.8	2	61	15.6
VERDE	28.3	59.8	2	66	15.5
Entry 221	28.2	60.9	0	66	14.6
N99-2234	28.2	60.8	5	76	16.8
2375	28.0	61.3	-1	64	15.1
960404-03	28.0	61.4	2	58	15.0
96S0356-15	28.0	62.0	1	61	15.1
ND 800	27.9	61.0	4	71	16.0
01M88	27.7	61.5	4	58	15.0
ND 751	27.7	62.3	5	69	16.0
ND 747	27.6	61.8	0	71	16.1
ES54	27.5	57.0	4	76	16.1
01M96	27.4	62.3	-1	64	15.7
BW307	27.0	55.5	5	74	16.0
MN99436-6	27.0	61.9	-1	58	15.6
ND 801	26.9	61.5	3	69	16.2
NDSW0246	26.3	60.2	4	69	16.3
Marquis	26.2	60.6	4	81	16.2
N99-0241	26.1	60.4	3	58	16.0
Chris	25.7	57.6	4	81	15.9
MT9929	25.5	60.8	3	58	16.4
Mean	28.3				
LSD (0.10)	1.4				
CV	4.6				

Table 20. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Swift Current, Canada.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Maturity Days	Height cm	Protein %	1000 K Wt. g
BZ 998-447W	44.0	54.9	95	69	15.3	27.0
Entry 264	43.9	55.9	96	68	15.1	24.5
98S0113-20	42.9	59.8	95	67	15.4	22.5
01M96	42.5	61.9	99	71	15	24.5
SD3641	42.4	58.9	98	71	15.1	27.5
960404-03	41.4	57.4	97	73	15.8	20.0
N99-0107	41.3	58.6	96	75	14.9	22.5
BW314a	40.8	57.6	99	82	15.9	23.0
WA007925	40.7	57.9	97	75	15.3	22.5
BW307	40.1	54.8	98	75	15.9	21.0
SD3618	40.0	55.9	95	69	15.8	21.0
N99-0241	39.9	57.4	97	69	16.1	22.5
ND 747	39.9	61.7	97	72	16.2	23.0
CA-901-735	39.7	59.0	98	71	15.5	23.0
ND 751	39.4	59.5	97	76	15.9	24.0
N98-0286	39.4	55.6	98	69	15.7	23.5
96S0356-15	39.3	0.0	96	79		
SD3635	39.2	57.6	98	65	15.5	23.0
ND 801	39.1	59.3	97	75	15.5	21.5
Entry 221	39.1	57.2	98	79	15.1	26.5
WA007931	38.1	58.6	96	78	15.4	22.5
Keene	38.0	59.1	96	73	15.5	21.0
N99-2234	37.7	58.2	95	76	16.2	23.5
MN99436-6	37.4	59.9	98	69	15.7	23.0
ND 800	37.3	57.2	97	73	16	22.0
NDSW0246	37.3	58.1	98	67	16.6	24.0
SD3540	37.1	59.3	98	69	15.3	22.0
Marquis	36.9	56.6	97	70	15.9	20.5
Entry 241	36.9	53.6	95	74	14.9	25.0
Chris	36.8	57.4	97	72	16.2	18.5
01M88	36.7	58.3	97	71	15.8	19.0
ND 741	36.5	0.0	100	71		
SD3546	34.7	58.3	97	74	15.1	26.0
2375	34.5	57.9	97	67	14.6	24.0
MT9929	33.4	0.0	97	71		
ES54	33.1	0.0	96	71		
Verde	31.9	55.9	98	73	15.5	21.5
MEAN	38.6		97.0	72.2		
LSD	9.0		2.9	12.6		
CV	0.2		1.9	10.8		

Table 21. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Glenlea, MB.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Maturity days	Height cm	Lodging 1 to 9	Leaf Rust	Stem Rust	FHB* 1 to 5
WA007931	78.7	61.9	97	91	1	90/S	2/R	3.8
ND 741	69.2	63.0	97	85	2	0/R	2/R	3.0
BZ 998-447W	69.0	59.6	95	82	1	0/R	5/MRMS	3.9
N99-0107	68.8	62.2	95	88	2	7/RMR	3/RMR	2.2
Entry 264	68.3	59.6	95	84	2	0/R	5/R	3.0
CA-901-735	67.2	62.9	94	73	1	TR/R	5/R	1.6
2375	66.7	62.3	94	80	2	50/MS	2/R	2.1
01M88	66.6	62.6	98	72	1	7/RMR	tr-10/R-MRMS	2.1
WA007925	66.2	61.4	92	85	2	90/S	tr/R	3.2
N98-0286	65.6	60.9	92	73	1	45/MRMS	tr/R	3.5
96S0356-15	64.3	62.4	90	74	1	TR/R	tr/R	1.7
NDSW0246	64.0	61.5	95	94	2	0/R	tr/R	2.9
SD3618	63.1	62.4	94	87	1	10/RMR	1/R	1.7
SD3635	62.4	60.5	92	86	2	25/MRMS	5/MRMS	1.9
SD3641	62.4	61.2	90	78	1	10/RMR	3/R	1.4
ND 751	61.7	63.4	95	92	2	0/R	tr/R	1.9
960404-03	61.7	62.2	95	69	1	7/RMR	1/R	1.9
BW314a	61.6	62.2	92	98	3	25/MRMS	tr/R	2.5
MT9929	60.6	61.9	91	77	1	0/R	2/R	3.9
98S0113-20	60.6	62.6	92	74	1	0/R	tr/R	1.6
SD3546	60.5	60.8	93	89	2	15/MRMS	3/R	2.0
Verde	60.2	60.4	94	82	2	TR/R	2/RMR	2.7
ND 800	59.8	62.4	92	86	2	0/R	1/R	2.9
SD3540	59.6	61.7	93	85	1	20/MRMS	1/R	2.1
ND 801	58.2	63.5	94	87	1	0/R	tr/R	1.5
N99-2234	57.9	62.9	95	93	2	TR/R	tr/R	1.8
MN99436-6	57.4	62.6	90	75	1	0/R	3/RMR	1.6
N99-0241	57.3	60.1	94	77	1	0/R	tr/R	2.8
BW307	56.2	59.7	91	100	3	15/MRMS	2/RMR	2.6
ES54	54.5	59.1	92	96	1	TR/R	1/R	2.8
Entry 241	53.6	56.3	95	83	1	0/R	2/R	3.7
01M96	53.0	63.1	91	82	1	0/R	2/R	2.8
Entry 221	52.2	58.3	97	83	1	TR/R	5/RMR	4.4
ND 747	52.1	65.4	93	89	2	0/R	tr/R	2.1
Keene	50.7	60.8	96	96	2	0/R	2/R	3.7
Chris	45.0	61.8	97	104	3	40/MRMS	tr/R	3.3
Marquis	41.1	59.7	97	110	3	90/S	20/MRMS	4.0
Mean	60.5	61.5	94.0	85.0	2.0			2.6
LSD	5.2	0.5	1.0	2.0	1.0			0.6
CV	10.1	0.5	1.0	2.0	30.0			16.4

* FHB rating: 1 = no visible disease, 5 => 75% incidence.

Table 22. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Summary of Means Across Locations.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm	Lodging 0-9	Protein %
No. Locations	19	18	16	19	5	9
ND 800	64.6	59.7	24	83	0.7	14.8
Entry 264	64.4	58.2	24	81	1.1	14.0
01M88	64.4	60.3	27	71	0.5	13.8
N99-0107	63.9	59.7	24	82	0.7	14.6
N98-0286	63.9	58.6	25	73	0.3	14.4
960404-03	63.7	59.7	23	69	0.8	14.3
MN99436-6	63.7	60.4	22	75	0.7	14.8
Entry 241	63.5	56.3	25	81	1.5	13.6
ND 741	62.9	59.9	24	83	0.7	15.1
SD3635	62.8	59.6	23	86	1.4	13.9
WA007931	62.6	59.2	25	87	0.7	13.6
SD3540	62.6	60.1	22	83	0.9	14.4
SD3618	62.4	59.7	24	83	1.0	14.5
N99-0241	62.2	58.8	25	76	0.1	14.7
ND 801	62.1	61.1	23	84	0.7	15.2
2375	61.8	60.4	24	79	2.0	14.4
WA007925	61.6	59.6	22	85	1.3	14.4
SD3546	61.5	60.4	22	87	1.3	14.8
96S0356-15	61.1	60.6	22	72	0.5	14.3
CA-901-735	60.6	58.9	22	69	0.1	14.3
Verde	60.4	59.0	25	76	0.3	14.3
SD3641	60.0	60.3	20	79	0.7	14.9
BZ 998-447W	59.9	56.0	22	80	0.9	14.4
ND 751	59.7	60.4	25	86	1.4	15.1
Entry 221	59.5	58.6	24	79	1.0	13.6
ND 747	59.5	61.3	23	84	0.5	15.5
01M96	59.4	61.4	22	80	0.3	15.1
Keene	58.8	59.7	25	94	1.1	15.1
98S0113-20	58.2	60.7	22	70	1.3	15.0
NDSW0246	57.8	59.6	25	90	0.7	15.6
BW314a	57.5	59.1	22	97	2.2	15.6
N99-2234	56.9	59.7	26	91	1.8	15.7
MT9929	56.8	58.6	25	76	0.5	15.1
ES54	56.6	57.9	26	92	1.5	15.8
BW307	54.8	56.7	26	95	2.2	15.7
Marquis	46.4	57.7	26	99	3.3	14.8
Chris	45.8	57.6	25	94	4.3	15.5
Mean	60.1	59.3	23.9	82.4	1.1	14.7
LSD (0.05)	4.1	1.0	1.0	2.5	1.1	0.4

Table 23. 2003 Hard Red Spring Wheat Uniform Regional Nursery, Yield Rank by Location.

Entry	Line	Crookston	Morris	St. Paul	Prosper	Langdon	Casselton	Minot	Carrington	Hettinger	Williston	Selby	Groton	Brookings	Sidney	Powell	Bozeman	Lind	Swift	Glenlea	Overall Line Rank
1	Marquis	32	31	26	37	37	36	36	34	36	36	32	37	37	37	37	37	34	28	37	37
2	Chris	37	35	36	36	36	35	26	N/A	37	23	37	36	35	36	36	34	36	30	36	36
3	2375	19	15	22	9	14	15	25	8	19	7	34	31	16	12	4	4	21	34	7	16
4	Verde	7	20	5	21	16	37	18	11	25	4	28	8	13	10	2	35	18	37	22	20
5	Keene	5	26	8	26	35	27	11	31	17	24	3	14	16	34	34	17	4	22	35	24
6	ND 741	26	23	15	3	7	29	15	26	15	19	7	4	4	27	8	13	9	32	2	13
7	ND 747	20	34	25	31	8	16	10	27	27	37	4	6	28	20	14	24	27	12	34	28
8	ND 751	4	32	29	17	22	31	12	13	34	32	15	3	19	31	25	19	25	15	16	25
9	ND 800	11	5	18	1	3	14	8	18	7	2	2	4	10	27	10	20	24	25	23	2
10	ND 801	15	17	21	13	5	13	20	17	22	29	12	2	6	25	18	24	32	19	25	19
11	NDSW0246	30	25	24	28	28	25	28	30	27	34	22	22	25	32	17	26	33	25	12	32
12	MN99436-6	3	13	4	5	18	10	8	21	14	15	8	7	12	19	21	2	30	24	27	6
13	SD3540	16	12	31	18	12	7	3	10	6	30	20	11	2	9	23	8	6	27	24	9
14	SD3546	21	21	29	4	1	21	6	14	35	11	5	9	22	21	30	15	9	33	21	18
15	SD3618	24	22	19	2	2	9	5	6	26	19	9	18	15	25	28	32	14	11	13	15
16	SD3635	21	8	32	6	24	2	17	4	2	17	13	21	3	22	20	27	6	18	14	11
17	SD3641	25	9	37	8	4	11	22	20	1	18	15	13	36	3	24	5	5	5	14	9
18	01M88	11	1	14	11	30	6	4	12	13	3	18	25	14	17	5	18	25	31	8	7
19	01M96	27	30	23	25	29	32	37	28	23	12	5	16	21	2	9	12	29	4	32	26
20	N98-0286	14	2	7	10	14	11	14	1	5	16	11	27	33	11	13	27	8	15	10	5
21	N99-0107	13	24	11	24	17	4	19	6	4	4	23	26	9	15	6	7	9	7	4	2
22	N99-0241	6	4	3	18	13	8	21	8	30	21	19	12	30	34	16	22	35	12	28	21
23	N99-2234	23	33	34	22	20	26	34	22	29	22	31	29	26	30	19	29	19	23	26	33
24	960404-03	1	14	12	16	5	5	15	5	20	27	13	9	24	18	12	29	21	6	16	8
25	96S0356-15	31	26	17	15	19	22	35	15	12	6	25	17	23	4	3	23	21	17	11	22
26	98S0113-20	35	37	20	33	20	24	31	19	11	32	21	15	31	8	26	9	17	3	19	29
27	BW307	34	36	28	30	23	18	7	33	32	31	27	33	34	29	35	31	30	10	29	35
28	BW314a	18	29	33	32	25	19	22	32	33	26	25	30	29	12	22	16	15	8	18	30
29	Entry 221	8	19	2	28	25	17	30	23	15	25	35	28	5	24	31	10	19	19	33	26
30	Entry 241	9	9	9	12	31	1	22	3	3	8	10	1	8	5	33	11	9	28	31	4
31	Entry 264	10	3	6	7	25	33	13	1	7	10	1	19	1	7	27	1	13	2	5	1
32	ES54	36	18	12	14	10	30	33	25	31	35	36	23	32	22	32	33	28	36	30	34
33	MT9929	29	11	35	35	32	34	27	35	20	27	30	20	7	16	7	21	37	35	19	31
34	BZ 998-447W	33	16	1	34	34	20	29	36	23	1	33	31	11	1	15	3	1	1	3	17
35	CA-901-735	2	7	27	22	8	28	32	24	17	14	29	24	20	33	11	36	15	14	6	23
36	WA007925	16	28	16	20	11	3	2	16	9	13	17	34	27	5	28	14	3	9	9	12
37	WA007931	28	6	9	27	33	23	1	29	10	8	24	35	18	14	1	6	2	21	1	14

N/A Data not available

Table 24. 2003 Hard Red Spring Wheat Uniform Regional Nursery, 2-Year Means Summary, 2002-2003.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm	Lodging 0-9	Protein %
N99-0107	53.9	59.2	27	77	0.8	15.2
N98-0286	53.5	57.6	28	69	0.6	14.9
ND 741	52.9	59.5	27	79	0.6	15.6
SD3540	52.8	59.3	25	78	0.7	14.8
SD3641	52.2	59.3	23	74	0.7	15.3
01M88	51.9	59.0	29	66	0.5	14.2
SD3546	51.8	59.7	25	80	1.0	15.3
2375	50.4	59.5	27	74	2.1	14.9
Verde	50.3	58.6	28	72	0.4	14.9
01M96	49.9	60.8	25	75	0.3	15.3
Keene	49.3	59.0	28	86	0.7	15.5
MT9929	49.2	58.0	28	72	0.4	15.5
Chris	38.3	56.8	29	88	3.4	15.9
Marquis	37.1	57.0	29	92	2.9	15.2
Mean	49.5	58.8	27.0	77.2	1.1	15.2

Table 25. 2003 Hard Red Spring Wheat Uniform Regional Nursery, 3-Year Means Summary, 2001-2003.

Line	Yield Bu/Ac	Test Wt. Lb/Bu	Heading d from 6-1	Height cm	Lodging 0-9	Protein %
SD3540	55.2	59.4	24	80	0.9	14.6
ND 741	54.8	59.4	26	80	1.4	15.4
SD3546	54.6	59.8	25	82	1.6	15.1
2375	53.4	59.6	27	76	2.3	14.7
Verde	53.0	58.6	28	74	0.8	14.7
Keene	52.2	59.0	28	89	1.3	15.1
Chris	39.4	56.8	28	92	4.3	15.6
Marquis	38.3	56.8	29	95	3.5	15.0
Mean	50.1	58.7	26.9	83.4	2.0	15.0

Table 26. 2003 Hard Red Spring Wheat Uniform Regional Nursery Scab Report, Crookston, MN.

Line	Heading d from 6-1	VSK %	Incidence %	Severity %	Disease Index
Marquis	32	24	100	43	43
Chris	32	30	95	42	40
2375	30	16	100	48	48
Verde	33	24	100	25	25
Keene	31	32	100	53	53
ND 741	31	19	100	56	56
ND 747	29	14	90	19	17
ND 751	32	11	100	19	19
ND 800	31	28	100	45	45
ND 801	29	7	98	17	17
NDSW0246	32	44	100	57	57
MN99436-6	29	21	100	24	24
SD3540	28	16	100	46	46
SD3546	29	21	100	52	52
SD3618	30	11	98	36	35
SD3635	30	8	100	29	29
SD3641	26	14	100	42	42
01M88	33	31	100	25	25
01M96	28	29	100	51	51
N98-0286	32	44	100	51	51
N99-0107	31	13	93	20	19
N99-0241	32	38	100	51	51
N99-2234	32	12	98	13	13
960404-03	31	31	100	44	44
96S0356-15	29	27	100	77	77
98S0113-20	30	19	100	46	46
BW307	32	11	100	39	39
BW314a	30	21	100	64	64
Entry 221	32	30	100	61	61
Entry 241	32	43	100	84	84
Entry 264	32	45	98	75	73
ES54	33	21	100	52	52
MT9929	31	40	100	91	91
BZ 998-447W*	30	31	100	76	76
CA-901-735	28	19	100	53	53
WA007925	30	24	100	57	57
WA007931*	33	19	100	50	50
BacUp	28	12	98	40	39
Roblin	28	38	100	89	89
McVey	34	26	90	25	24
Wheaton	32	67	100	76	76
MN00269	34	8	90	10	9
Mean	30	24	99	47	47
LSD	1	11	ns	24	24

Table 27. 2003 Hard Red Spring Wheat Uniform Regional Nursery Scab Report, St. Paul, MN.

Line	Heading d from 6-1	VSK %	Incidence %	Severity %	Disease Index
Marquis	21	19	40	11	5
Chris	23	24	73	24	17
2375	23	13	55	19	11
Verde	24	24	83	18	15
Keene	23	30	80	22	18
ND 741	24	21	83	18	14
ND 747	21	11	68	13	8
ND 751	24	5	58	13	8
ND 800	24	18	78	26	20
ND 801	21	8	65	14	9
NDSW0246	24	11	78	25	19
MN99436-6	20	12	85	17	15
SD3540	20	10	70	16	12
SD3546	21	43	83	25	21
SD3618	23	25	70	15	10
SD3635	24	14	65	13	9
SD3641	17	8	63	17	11
01M88	24	37	88	24	21
01M96	21	14	65	16	10
N98-0286	24	26	75	31	24
N99-0107	24	10	70	15	10
N99-0241	24	19	75	16	12
N99-2234	24	11	53	17	9
960404-03	22	28	78	25	19
96S0356-15	20	25	95	33	31
98S0113-20	21	26	98	33	32
BW307	24	7	80	23	18
BW314a	21	28	98	42	41
Entry 221	24	17	85	30	25
Entry 241	24	34	98	61	59
Entry 264	24	49	95	59	56
ES54	24	15	80	25	20
MT9929	24	28	85	47	43
BZ 998-447W	21	31	100	58	58
CA-901-735	20	13	78	18	14
WA007925	21	32	100	34	34
WA007931	24	16	78	30	23
BacUp	20	11	65	14	9
Roblin	20	31	100	52	52
McVey	24	25	78	15	12
Wheaton	24	60	100	47	47
MN00269	27	9	68	17	12
Mean	22	21	78	26	22
LSD	2	18	27	14	16

Table 28. 2003 Hard Red Spring Wheat Uniform Regional Nursery Rust Report, St. Paul, MN.

Line	Adult Plant Leaf Rust*	Adult Plant Stem Rust**
Marquis	60 MS-S	30 MR-MS
Chris	30 MS-MR	5 MR
2375	20 MR-MS	5 R-MR
Verde	5 MR	20 MR-MS
Keene	20 MR/50 MS-S	10 R-MR
ND 741	TR	TR
ND 747	TR	0
ND 751	TR	TR
ND 800	5 MR	TR
ND 801	TR	TR
NDSW0246	T-MR/20MR-MS	TR/20 MR-MS
MN99436-6	5MR/20MR-MS	10R/30 MS-S
SD3540	20 MR-MS	10 R
SD3546	5MR	5 R-MR
SD3618	5MR	5 R-MR
SD3635	T-MR	10 R-MR
SD3641	5 MR	10 R-MR
01M88	20 MR	0
01M96	5 R-MR	5 R
N98-0286	40 MS/5 R	20 MR-MS/40S
N99-0107	10 MR/20 MR-MS	20 MR
N99-0241	T-MR	TR
N99-2234	5 MR	5 R-MR
960404-03	T-R/30 MR-MS	5 R-MR
96S0356-15	10 MR	TR
98S0113-20	TR	0
BW307	10 MR	20 MR-MS
BW314a	30 MS	5 MR
Entry 221	20 MR	50 MS-S
Entry 241	5 R-MR	40 MS-S
Entry 264	10 R-MR	40 MR-MS
ES54	30 MS	10 MR
MT9929	5 MR	10 MR
BZ 998-447W	40 MS-S	50 MR-MS
CA-901-735	20 MR-MS	5 R
WA007925	60 MS-S	40 MS
WA007931	50 MS-S	40 MS

* Rating date (7/16), leaf rust races used in inoculations: MBRJ, MCDJ, THBJ, TNRJ

** Rating date (7/23), stem rust races used in inoculations: QTHJ, RKQQ, TPMK, TTTT